The DRILLER

Won't You Wait . . ."

When the cows come home they'll find plenty of fresh water coming from this well that Oscar Nygard, Toivola, Minn., put down. Story on page four.

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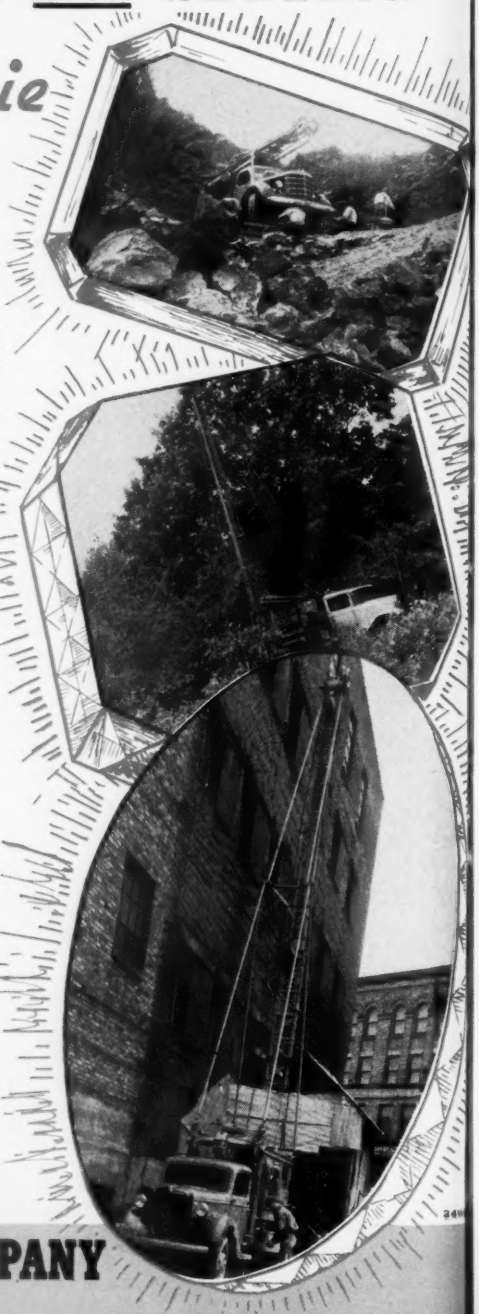
VOLUME 21 JANUARY, 1947 NUMBER 1

REAL GEMS IN ANY SETTING --

Bucyrus-Erie Drills



WHETHER it's jammed in tight against a mountain crag, hugged by the dense tangle of underbrush and forest, or squeezed in the midst of towering buildings — a Bucyrus-Erie drill will give you high-caliber drilling performance because it is constructed to meet the requirements of whatever your job demands.

Made of the best materials by experienced craftsmen, Bucyrus-Eries have the durable strength to pound down hole day after day with the same elastic drilling motion that has made them tops in drilling efficiency throughout the years.

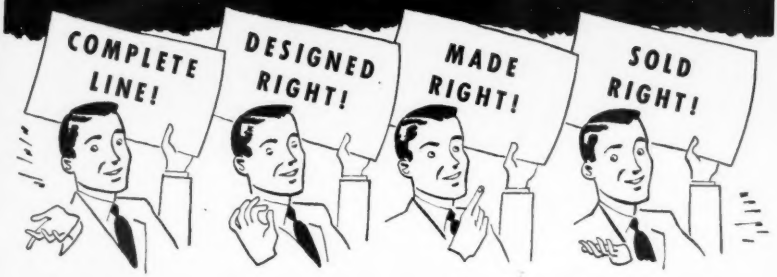
Their easy maneuverability enables you to set up and tear down quickly in even the most cramped spaces. Remember, all three models—21-W, 22-W, and 24-L—possess these outstanding features that make Bucyrus-Erie drills real profit-earning gems for any setting.

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSI

4 REASONS WHY-

DEMING IS A WELL DRILLER'S LINE



The fact that every year sees more and more experienced well drillers *"swing to Deming"* proves that Deming Pumps and Water Systems are *designed right, made right* and *sold right!*

DEMING
THE *COMPLETE* LINE

- Shallow and Deep Well Pumps and Water Systems
- Jet-Type Pumps and Water Systems
- Turbine Pumps (Water Lubricated) for Deep Wells
- Centrifugal Pumps in a wide range of types and capacities
- Cellar Drainers and Sump Pumps
- Rotary and Oscillating Pumps (hand and power)
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Add to those facts the wide range of types and capacities of pumps and water systems available, and it's easy to see why DEMING IS THE WELL DRILLER'S LINE!

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Constant research and development work at Deming assures well drillers and their customers top values in every type of Deming pump and water system.

Deming advertising and sales promotional activities back you up in building good will and better business. For complete details on the complete Deming line, write:

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DEMING
THE COMPLETE LINE
PUMPS AND WATER SYSTEMS

Minnesota Driller Hustles In Summer

This Gopher driller has plied his trade with an honest industriousness that has made the name of Nygard synonymous with water well drilling for miles around his northern Minnesota home.

DURING eight months of the year the wild, scenic timberlands of Northern Minnesota resound with the thumping clang of a drilling rig driving pipe as Oscar Nygard, Toivola, busily goes about his task of providirg water for the hearty farmers of the north country. The rest of the year centers around the friendly glow of the kit-

• (Left) Driller Nygard and Helper Ross Jacobsen have already installed a pump on the four-incher put down for the Jacobsen Bros. farm at Wolf, Minn. (Below) A pumping test showed the 83-foot well capable of producing 600 Gph.

chen stove and mugs of steaming coffee while swirling snows and frigid gusts of wind cut outside work down to the minimum.

With his drilling work necessarily curtailed each year by the weather, Oscar is forced to hustle during the available months in order to keep up with the demands of his eager clients. In any direction away from Toivola for the distance of at least 50 miles, the name of Nygard and his present whereabouts are well-known. And rightly so. For the past 15 years Oscar has averaged 20-25 wells a season and has come to be the accepted water producer for his area.

Drilling water wells came naturally to Oscar as previous to drilling for water, he had worked with steam and air drills for the railroads and iron ore mines in that locality. As in the case of many other drillers, he began his water well career with a home-made rig that he built with his own hands. This in turn gave away to another rig of his own construction, but he admits that neither of them were world beaters. His first purchased rig was a Cyclone drill that served him in good stead until a year ago when he secured a Bucyrus-Erie 21-W.

Hits Boulders

Slate and gravel compose most of the formations in which Nygard drills, but these formations are sometimes liberally sprinkled with granite boulders which, he asserts, are real headaches. Because of these boulders, he is forced to do a good deal of blasting. On one occasion he was drilling a four-incher for a turkey farmer when he hit granite rock at a depth of around 85 feet.

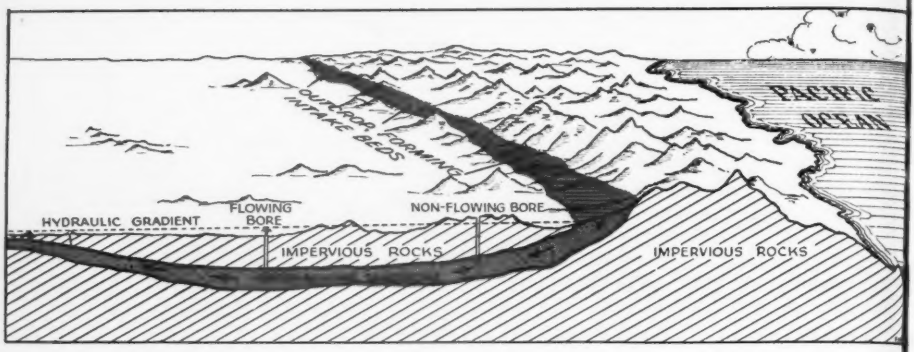
His helper measured out the amount of blasting wire and the charge was set. After the hole was shot, Oscar, upon checking the results, learned that his helper had cut the blasting wire too short and

• This view of Nygard's rig shows how Oscar's pumping unit has been mounted on the side of the 21-W.

that the charge had shredded the casing at 80 feet. Upon pulling the casing, Nygard found three feet of mashed pipe and discovered that his drive shoe plus pieces of casing were still in the hole. He was now confronted with the problem of drilling past this obstacle. After mulling the situation over in his mind a while, Nygard tried the following method. He put a new drive shoe on another length of casing and inserted a block of wood inside the shoe. This was done in such a manner that the wood protruded out through the shoe. This end was sharpened. When this was let down into the hole, the peg pushed the iron aside and Nygard was able to continue his drilling operation. The well was finished at 100 feet and provided plently of water for 6000 turkeys and a herd of cows.

Oscar doesn't possess any fishing tools, yet he has the good fortune to never have lost a string of tools. He builds his own fishing tool to fit what ever the particular job calls for. Wood and pipe plus ingenuity furnish his materials in the majority of

(Continued on page 16)



• Theoretical illustration of an artesian basin.

Artesian Well Failures Worry Australians

OF PARTICULAR concern to Australian cattle and sheep raisers has been the marked decrease in the amount of water flowing from artesian wells in the Great Artesian Basin which provides a huge pasture for the important cattle herds and sheep flocks of Australia.

A committee of investigation was formed to ascertain the nature and structure of the basin from the point of view of its water content and sources of supply, and to study the geological, physical, and chemical aspects of the problem of diminishing supply. A summary of this report follows.

The great Artesian Basin of Australia underlies parts of Queensland, New South Wales, South Australia, and the Northern Territory to an extent of some 550,000 square miles. It has a total length, north and south, of 1,200 miles, and 1,100 miles across at its widest part.

Approximately 350,000 square miles of the Basin are in Queensland, underlying practically all that part of the State west of the Great Dividing Range, with the exception of an area in the Northwest adjacent to the Northern Territory.

The land in question is devoted almost exclusively to sheep and cattle grazing, and pastoralists have been forced to incur considerable expense in augmenting reduced water supplies or in replacing supplies which have failed, by drilling additional wells or by providing surface

Diminishing water production by the artesian wells in Australia's Great Artesian Basin prompted a government investigation of the basin's water resources. Through the courtesy of the Office of the Coordinator-General of Public Works, Brisbane, THE DRILLER presents a description of the problems and the conclusions derived from the report.

storage in excavated tanks or dams. Concern is continually being expressed at the constant diminution of artesian flows and the consequent difficulty and expense in providing other water supplies.

The matter of diminution, however, has not been left for casual speculation, but has received earnest attention in official quarters since it first became apparent. A hydraulic survey was commenced in 1896, only nine years after the first private well in Queensland had been completed in the Cunnamulla district, and in 1910 "The Rights in Water and Water Conservation and Utilization Act" was passed and appropriations made under the Act for the purpose of investigation, geological and hydrological surveys having supported the view that supplies were limited and were being overtapped.

According to official records the first well from which a supply of water was obtained from the Great Artesian Basin was drilled on Kallara Station, New South Wales, in 1878, and the first deep well in the Basin in Queensland was commenced at Blackall in 1885. This well is still flowing.

Wells Increase

At the end of 1899, 524 wells had been drilled, of which 505 were flowing and delivering 223.6 millions of gallons every 24 hours; an average of 442.7 thousand gallons per 24 hours for flowing wells, or 426.7 thousand gallons for 24 hours for all wells drilled.

Twenty years later, in 1919, the total number of wells had increased to 1,434, of which 1,174 were flowing wells delivering 341.3 million gallons per day, an average of 291.0 thousand gallons per day for flowing wells and 238.0 thousand gallons per day for the total number drilled.

The average depth of these wells is nearly 1,550 feet, the shallowest being 6 feet deep and the deepest 7,009 feet, a distance of 1⅓ miles. The total amount of hole put down is 3,109,432 feet, or approximately 588 miles. The temperature of the water varies from that of the earth's surface to 212° F.

Approximately 5,000 sub-artesian wells within the Artesian Basin have been registered but a number are shallow, and drilling sections indicate that they have tapped an aquifer not connected with the main artesian beds.

The use of the waters of the Basin developed rapidly in Queensland from 1887 until about 1900-1902, when what would now be termed a depression interrupted development in all industries. After a return to more or less normal conditions, the tapping of the Basin increased until interrupted by the First Great War. The consequent shortage of materials and the reduced rate of development may be said to have continued to the present time.

Drillers Are Expert

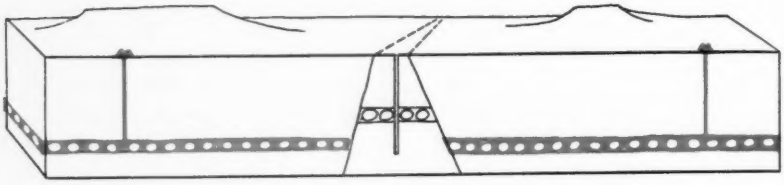
About 81% of the wells have been drilled by private interests, 10% by the Department of Irrigation and Water Supply, 7% by Local Authorities, and 2% by the Railway Department.

Drilling is carried out by the percussion drill method and many of the operators are expert to an uncanny degree seemingly being able to sense, from the behavior of the tools and the evidence of the drillings, the nature of the strata in which the drill is working.

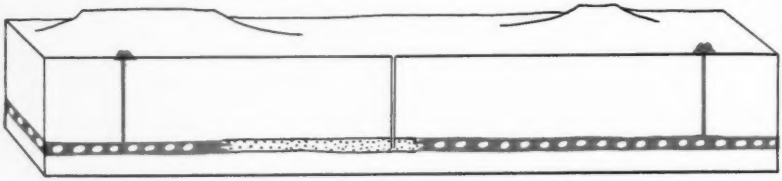
The wells are cased with mild steel tubing, usually an upper and outer "string," 8 inches in outside diameter and 9/32-inch in thickness, and inner string from surface to bottom of 5 or 6 inches outside diameter and 1/4 or 3/16 inch in thickness.

The water is usually distributed

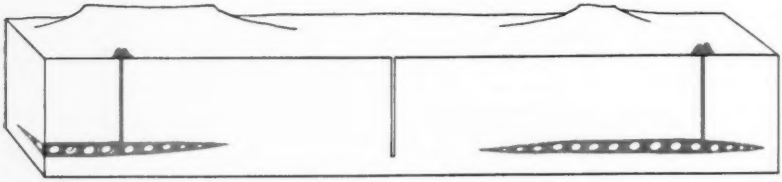
Geological Explanation of Dry and Flowing Wells



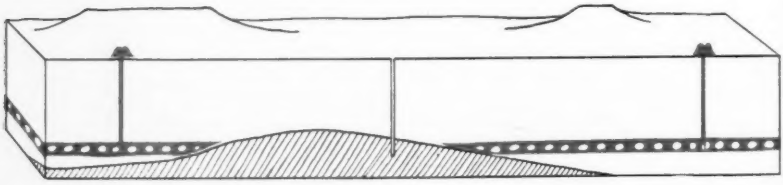
• Failure of central well is due to location of fault block in which porous bed has been drained.



• Failure of central well due to location in a less permeable part of the porous rock.



• Failure of central well due to location between lenses of porous rock.



• Failure of central well due to location on buried ridge of bedrock.

by open drains, which vary from 18 inches wide and 9 inches deep to 6 feet wide and 15 inches deep. Periodical cleaning of these drains to remove weed growth, silt, etc., is necessary and usually results in a deepening of the drains, so that the average is now about 3 feet 6 inches by 12 inches.

This method of distribution has disadvantages. There are considerable losses from evaporation and soakage, estimated at an average of 10,000 gallons per mile in 24 hours,

and it is also claimed that actually less than 5 per cent of the water distributed for the use of stock is consumed by the stock.

Consideration has been given to the adoption of better systems of distribution with a view to reducing these losses, but the matter is one of economics as well as mechanics, and the cost of installing pipes or cementing drains over an area which carries, say, only one sheep to 6 acres may be out of proportion to the benefits to be derived.

If, however, an economic system of distribution can be evolved, considerable control would be possible at many wells and the maintenance of pressure by this means would extend their period of flow, probably indefinitely. From this it follows that the expense entailed on improved distribution may well save considerable expenditure in pumping apparatus and running costs at a later date.

Water Flows Cease

Such an aspect of the problem of conservation will receive consideration by the Committee when the economic and legislative aspects related to the Basin generally are being considered.

Statistics show that more than 700 wells have ceased to flow. These wells are situated in the relatively high marginal portions of the basin and available data seem to indicate that eventually the non-flowing wells will be those on the higher levels and that the wells on the lower levels will flow indefinitely.

The cost of pumping facilities at these non-flowing wells is not prohibitive, but the cost of new wells equipped with pumping facilities to replace the drains formerly serving the area is in many cases not economical.

One more serious aspect of the diminution is that there are certain areas, such as that to the west of St. George, where the wells can no longer serve the complete length of the drain system. In such cases a small, unwatered area develops at the lower end of each drain and remains partially unproductive until watered by a new facility.

The flows obtained from wells drilled in the early development of the Basin were often large, on several occasions a flow of almost 2 million gallons a day being obtained, but these wells showed a very rapid diminution, especially in areas which were heavily tapped, such as the flood plains of the Warrego and Flinders Rivers.

Pressure Diminishes

By 1915 the rate of diminution was exceeding the flow being obtained by the drilling of additional wells and the total flow of all wells has continued to diminish until it is now reduced to less than two-thirds of the peak delivery, which was 355 million gallons per day in 1914.

Available data supports the view that diminution of flow has resulted almost entirely from diminution of pressure in the water beds. The indications are that any loss of flow due to chocking of the beds at well intakes, deterioration of casing (except in corrosive areas) or lateral leakage, is relatively not important. In general, new wells obtain flows substantially consistent with those issuing from adjacent wells, irrespective of their age.

It is hoped that the mean annual replenishment will be discovered from an examination of the geological and hydrological investigations in relation to an analysis of pressure and flow tests, and by the finding of what is likely to be the steady state flow, or ultimate constant delivery, of the wells.

(Continued on page 17)

The DRILLER

A JOURNAL FOR WATER WELL DRILLERS

Published every month by:
Excavating Engineer Publishing Co.
South Milwaukee, Wisconsin

Single copies 25 cents
Subscription price $1.00 per year
Canada and Foreign. $2.00 per year.

E. M. Heuston, Publisher
D. B. Reed, Jr., Managing Editor
M. B. Jaeger, Editor
G. M. Butler, Associate Editor
M. J. Bargenquest, Sales Manager

Consulting Editors
G. R. Watson **W. J. Walsh**

Address Communications to:
The Driller, South Milwaukee, Wis.

Vol. 21 January, 1947 No. 1

Readers Extended New Year Greetings

AS in past years, THE DRILLER takes this opportunity in the first issue of the year to extend sincere best wishes to its readers for a happy and prosperous New Year.

The staff also thanks the many readers whose kindness and courtesy were directly responsible for the publication of a magazine devoted to the interests of all water well drillers. During 1946, we published 14 articles on field operating problems, five stories on new developments, four technical articles, and two on historical subjects. Besides these articles, there were such companion features as "Mailbag," "The Driller & The Law," "Bargain Counter," "News of the Month," and the popular "Wit Bits" page.

With your continued cooperation, we will try to cover the water well drilling field with the same completeness as in the past, and remain alert to bring you all new developments in the field. Use of our "News of the Month" columns remains open and free to state associations of water well drillers as well as to individual drillers with specific items of interest. Your comments and suggestions are always appreciated.

Bucyrus-Erie Names New Distributors

ANNOUNCEMENT of the appointment of two new water well drill distributors has been made by Bucyrus-Erie Company, South Milwaukee, Wisconsin. The appointments went to Beacon Supply Company, Pampa, Texas, and Iverson Tool Company, Tulsa, Oklahoma, both of whom have been distributors of Bucyrus-Erie oil well spudders and are now adding the water well line to their equipment.

Beacon Supply Company, until recently known as Murray Tool & Supply Company, is well known in the territory in which they will handle the popular Bucyrus-Erie water well drills. They will sell the 21-W, 22-W, and 24-L in northern Texas, northwestern Oklahoma, and southern Kansas.

Iverson Tool Company's territory will consist of central Texas, Oklahoma with the exception of the northwest portion, and southwestern New Mexico — a region in which they are well established and known. Besides their main Tulsa offices located at 216 W. 2nd St., the company has branch offices in Fort Worth and Odessa, Texas; Artesia, N. M., and Oklahoma City, Okla.

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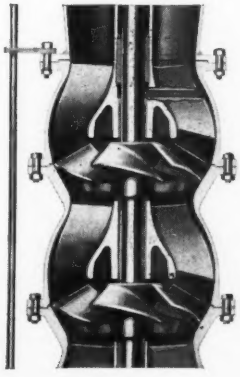

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Cutaway view of Mixed-Flow multi-stage pump impeller and bowl construction revealing high efficiency impellers used for more economical lift.

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PROPELLER TYPE PUMPS

Peerless pumps, embodying the Hydro-Foil principle, are also available in the propeller type and are capable of handling identical capacities of the Peerless mixed-flow pump. Request Bulletin B-143 on design, construction and application data of these two outstanding types of Peerless Pumps, for large-volume pumping.

NEWS OF THE MONTH

Montana Drillers Form Organization

OVER 30 water well drillers from various communities in Montana met in a two day session November 18 and 19 to form the Montana Well Drillers Association according to R. C. Simpson, Malta, who was elected Secretary-treasurer of the new organization.

Other newly elected officials were: Walter J. Riddock, Helena, President; L. E. Anderson, Billings, Vice-president; K. D. Thompson, Wibaux, Director; R. I. McCutcheon, Havre, Director; A. Russell Mowbray, Director, and D. A. McCoy, Rudyard, Director. The next meeting of the association is scheduled to be held in Havre on April 23 and 24.

The association plans to work in conjunction with sanitary officers, state and federal geologists, and water experts.

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North Dakota And Gopher Drillers Meet This Month

CONVENTION committees for the various state associations are hard at work planning convention programs and making arrangements for manufacturers' exhibits as this issue of THE DRILLER goes to press.

North Dakota . . . Jan. 6 and 7

Devils Lake will be the scene of the annual meeting of the North Dakota Well Drillers Association to be held January 6 and 7 at the Great Northern Hotel according to Fred V. Sletvold, secretary.

The meeting is of great importance as much time will be devoted to discussing the proposed law, drawn up at the directors' meeting, for the licensing of the water well drillers of the state.

Minnesota . . . Jan. 28, 29, 30

Edwin H. Renner, Secretary-Treasurer, informs us that Minnesota well men will convene January 28, 29, and 30 at the Ryan Hotel in St. Paul. Present plans call for a smoker and buffet lunch on the first day with the election of officers and the annual banquet scheduled for the 30th. A discussion of important matters pertaining to the water well industry in Minnesota will headline the business sessions.

Indiana . . . Feb. 6 and 7

The annual meeting of the Indiana Well Drilling Contractors Association will be held February 6 and 7 (Thursday and Friday) in the city of Kokomo according to Earl H. Merritt, secretary.

Convention headquarters will be in Hotel Frances where rooms have been secured for business and display purposes. Merritt urges all who plan to attend to make their room reservations immediately. Kokomo was chosen as the site of the meeting because its central location in the state makes it more accessible to all drillers. Programs will be mailed out as soon as they are printed.

Wisconsin . . . Feb. 28 and 29

President B. G. Garber announces that the Badger drillers will meet this year February 28 and 29 at Oshkosh in the Raulf Hotel. Program arrangements are being carried out.

Illinois . . . March 5, 6, 7

Announcement has been made that the Illinois Water Well Drillers Assn., Inc., will hold their convention in Urbana on February 12, 13, and 14. Program plans are being carried out.

Missouri . . . April 14 and 15

The Missouri Water Well Drillers Association will hold their 11th annual convention in Rolla on Monday and Tuesday, April 14 and 15. Headquarters for the two-day meeting will be the new Missouri Geological Survey building, where space will be available for all business session as well as manufacturers' displays.

Though the complete program will be announced at a later date, the annual banquet will be held on Monday night. All water well drillers and contractors in the Midwestern states are invited to attend the convention.

Monitor Windmills are designed to reduce storm strain instead of fighting it. That is why they can ride out most storms without damage.

An automatic wind governor keeps the wheel from excessive speed regardless of wind velocity. The wheel cannot run wild even in a storm.

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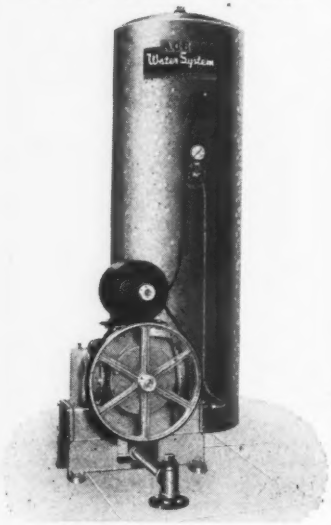

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North Carolina Drillers Convene At Raleigh

THE first annual convention of the North Carolina Well Drillers Association was held in Raleigh on December 12, 13, and 14 at the Carolina Hotel and was attended by some 40 well drillers and manufacturers' representatives.

After the opening afternoon session which featured registrations and a meeting of the board of directors, there was a general meeting of the association followed by talks on pumping installations delivered by Peerless Pump Co. and Fairbanks Morse Co. representative. The next morning the drillers heard talks by Geologists J. L. Stuckey and M. J. Mundorf; W. I. McKimmon, Sanitary Engineer, and G. Fish of Spang & Co.

The afternoon program began with the showing of drilling movies exhibited by Bucyrus-Erie Co. followed by a general meeting of the association which reelected the following officers; R. O. Heater, Raleigh, President; L. L. Martin, Hickory, Vice-president, and C. M. Hudson, Durham, Secretary-treasurer. Directors chosen included R. E. Faw, Hickory; W. A. Kirkley, Charlotte; M. A. Holder, Clemmons, and R. M. White, Norlina.

Buckeye Drillers Elect Officers

THE election of officers highlighted a meeting of the Ohio Well Drillers Association, Inc. held December 14 in Columbus. The next meeting is scheduled for February 22 according to E. D. Allen, secretary-treasurer.

Returned to the presidency for the second term was A. L. Mills of

(Continued on page 21)

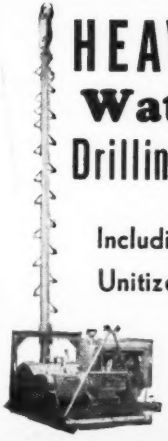
Pumping System Saves Crop From Drought

• Driller Ralph Bower (left) and W. Thorne, owner of the farm, survey their crop-saving water system.

THE best insurance against seasonal droughts is pump irrigation according to William Thorne whose successful stock and grain ranch near Bladen, Nebraska, furnished visible proof this past season.

Four years ago Thorne purchased 1600 acres of land north of Bladen after having operated irrigation farms in Colorado. Learning that crop failures around his new home were often experienced due to the lack of water at some critical period of the growing season, Thorne contracted with Ralph Bowers, a well driller from Hastings, to put down an irrigation well and install a pump that would serve 200 acres of corn.

A test well was drilled to ascertain the depth and thickness of water bearing sand. From the test it was decided to drill a 12-inch diameter well, approximately 200 feet deep, which was done. After consideration of operating and maintenance costs, it was decided to install a 12-inch Deming turbine pump capable of furnishing 1200 to 1500 Gpm. As electricity was not available, a diesel



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SHREVEPORT, LOUISIANA

horizontal single cylinder engine was obtained and the pump was equipped with a right angle gear drive.

The entire installation was completed in the latter part of July and not a bit too soon. The 200-acre corn crop was in the tassel stage, and although there had been ample moisture in the Spring and early part of the Summer, a dry, hot spell of several weeks now threatened the crops.

Thorne immediately threw his pumping unit into operation and pumped water continuously for nine day, 24 hours a day. Approximately 4½ inches of water was placed on the 200-acre crop during the entire nine days in which extremely high temperatures and hot winds with no natural rainfall were experienced.

A few weeks later, the corn on Thorne's ground had a healthy, dark green appearance, much of it 10 and 11 feet in height and well eared. Standing on the edge of this irrigated corn and looking into a neighbor's field where the corn tassels and leaves were burned brown and dry with the drought—a total loss—Thorne realized that without adequate irrigation his crop would have been in the same condition.

Instead of a loss, he harvested an average of 80 or more bushels per acre of corn on the 200 acres, and proved again that pump irrigation can frequently pay for the cost of the well and the pumping equipment and even show a profit on the investment in the first year of installation.

Complete new Dealer Aid Program — described and illustrated in 44-page catalog of sound, workable ideas. Signs of many kinds, decals, retail advertising material, record forms, etc.— all available to Myers dealers. Write for full information.

THE F. E. MYERS & BRO. CO.
Dept. H-28, Ashland, Ohio

Minnesota Driller...

(Continued from page 5)

cases. On his last fishing job he was down 70 feet in a five-inch hole when he lost his bit. The recovery procedure was simple. He merely inserted a three-inch casing inside the five-inch and drove the three-inch down over the top of the pin end of the bit, and then lifted it out.

Most of the Minnesotan's wells are from four to six inches in diameter and average between 85-100 feet in depth. He sharpens all of his bits at home in his blacksmith shop and has had good luck with tempering them in salt water. The amount of heat applied to the bit is determined by the color method. At the present time his biggest problem is one common to the drilling field—lack of casing with which to continue work on a large back-log of orders.

Buy Savings Bonds

IN cooperation with the U. S. Savings Bond Division of the Treasury Department, THE DRILLER urges its readers to prepare for the future by investing in Savings Bonds.

Artesian Wells . . .

(Continued from page 9)

The flow of water from the Basin and its diminution have so constantly been stated in terms of hundreds of thousands, or millions of gallons and so unrelated to any other factor that many false impressions have been gained.

One false impression is that the water will ultimately cease to flow, and that, when this happens, the industries and settlements of the West are doomed.

The plain answer to this view is that it is by no means proved that all the wells will cease to flow, that it is almost certain that many of them will not cease to flow but will assume a perpetually steady rate, that the flow of many of them may be conserved by control at the well head (reducing the total annual flow or saving in the winter a proportion which will be available if necessary to increase the flow in the following summer) and even if the wells do cease to flow the water is still available for pumping.

Total Discharge Given

In 1943, the total daily discharge was 229.2 million gallons per day, or thirteen times as great as the average daily consumption in the year 1942-43 for the Greater Brisbane Area, and it was estimated that, to the end of 1943, the total discharge of the flowing wells in Queensland had amounted to 5,197,358 million gallons. This amount would be sufficient to cover 19,090,000 acres to a depth of one foot or to fill Sydney Harbor 55 times.

An enormous quantity of water, but it is only equivalent to a depth of less than one inch (0.93 inch), over the Queensland portion of the Basin. Assuming that the intake area is the probable 30,000 square miles, that the porosity of this area is 20 per cent, and that there has been no replenishment since the first well was drilled, it is only sufficient to lower the level in the intake beds by 5 feet.

The present flow per annum from all wells is equivalent to a depth of about one-fifth of an inch over the area of the intake beds; the average annual rainfall over that area is some 25 inches, and, while only a very small proportion of this rainfall may enter the intake beds, it seems obvious that no appreciable reduction of the intake bed water level can have taken place.

This simple analysis suggests that the cause of the diminution in flow is not to be found in a lowered intake level, and supports the theory that early flows are influenced by the "elastic factor" of the water bed and that diminution represents the lessening of this elastic effect (a feature associated with the structure of

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artesian basins and the flow of artesian waters); that the first flow from a well is a "flush flow," due to this elasticity, and when the elastic pressure is completely released the flow will proceed at a steady rate in conformity with the amount of intake, the hydrostatic pressure, and the altitude.

This investigation indicates that the water, which flows from the artesian wells, is contained in several porous layers of sand or rock, known as aquifers, which occur at different depths and extend over vast areas. These permeable beds of rock are frequently exposed at the eastern margin, where rain water can percolate into them, and slope down towards the Center of the Basin. They vary considerably in thickness and permeability and in some localities may be absent. The water originally contained in the aquifers was probably brackish water, incorporated in the sands when they were laid down, but its composition has been gradually changed by the infiltration of rain water through the exposed intake areas. The water entering at the intake area flows down the sloping aquifers towards the central portion of the Basin. Due to the frictional resistance of the sandstone of the aquifer, the motion is extremely slow, but so great is the area of the aquifers that enormous volumes of water are transmitted. Under the great pressure from the elevated intakes, the slow infiltration of water over the long ages has caused distention of the water-bearing beds. When a well is put down and pierces an aquifer, the distention in the area near the well is gradually relieved by the tremendous weight of the overlying rock. At first the flow from the well is greater than the rate at which water can flow from the intakes and consequently the pressure and the flow gradually decrease to an amount which can be supplied by the replenishment from the intakes. A study of the life history of many individual wells discloses this characteristic diminution of pressure and flow, but the rate of diminution gradually decreases.

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Conclusion Stated

The conclusion of primary importance is that, though any new well will suffer a diminuation of pressure over a long period, the rate of loss of pressure may be expected to gradually decline and cease. If the well be situated on comparatively high ground, the pressure may decline until it is insufficient to raise water to the surface and the well will cease to flow, as many wells have ceased to flow, but such wells will continue to supply water if pumped.

Many wells are so situated that the residual pressure will suffice to force water to the surface, and it is

anticipated that such wells will flow for long periods.

It has also been established that the total or partial closing of the valve on the outlet of a well will delay the diminution of pressure and result in conserving water which will be available at a later date, thus prolonging the flowing life of the well. In cases where the construction of a well will permit control of it with safety, it is sound policy for the owner to so regulate the flow as not to exceed his actual requirements.

There may be small portions of the Basin where the water is derived from deep-seated (plutonic) sources or from isolated lenses, not connected to intakes, and in such cases there may be no replenishment and wells may be expected to ultimately fail, but these conditions apply only to a small proportion of all the wells, if any.

Over much of the area the available evidence indicates that the wells will continue to supply water.

• The 21-W of L. L. May, Cudahy, Wisconsin, is shown on a five-inch job for a home well located on the outskirts of South Milwaukee. The hole was down about 30 feet at the time the picture was taken.

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WIT BITS

Junior: "Pop, when I bring home my report card, why do you always sign it with an X instead of writing your name?"

Father: "I don't want your teacher to think that anyone who can read and write would have a son as dumb as you."

The patter of little feet was heard at the head of the stairs. The bridge party hostess motioned for silence.

"Listen," she said softly. "The children are going to deliver their goodnight message. It always does something to me inside when I hear them."

There was a moment of hushed expectancy. Then from the head of the stairs: "Mommy, Willie found another bedbug."

Visitor on farm: "How in the world do you tell the geese from the gander? Why they look exactly alike."

Farmer: "We don't bother about that, lady. We just put them all together and let them figure it out for themselves."

The officer watched a woman trying to maneuver her car out of a parking place and not doing so well at it. First, she banged into the car ahead, then into the one back of her, and finally pulling out of the space, cracked into a car passing. This was too much for the "law" — he walked over to her and said:

"Let me see your driver's license, lady."

She gave him a friendly smile before replying, "Don't be silly, officer, who'd give me a license?"

They laid him out on the police floor, and the cop who brought him in stood by while the doctor examined him. Finally the doctor arose and said, "That man's been drugged."

The cop went white and shivered. "That's right, sir. It's my fault. I drug him 6 blocks."

"Come up and see me some time," said the cute young thing. "Just ring the doorbell with your elbow."

"Why the elbow?" asked the gallant sailor.

"Well, you're not coming empty-handed, are you?"

The celebrated soprano was doing a solo when Bobby said to his mother, referring to the conductor of the orchestra:

"Why does that man hit at the woman with his stick?"

"But he isn't hitting at her," replied the mother.

"Well, then, what's she holler'n for?"

In an insane asylum sat a man fishing over a flower bed. Wishing to be friendly a visitor walked over, asked: "How many have you caught today?"

Replied the inmate: "You're the ninth."

They were driving in a secluded spot when the car sputtered and stalled.

He: "Outa gas, by golly."

She: "Oh, yeah?" (Pulls out flask).

He: "Ah, what have we here?"

She: "Gasoline."

Buckeye Drillers . . .

(Continued from page 14)

Warren who was accompanied in re-election by E. D. Allen, Steubenville, to the office of Secretary-treasurer. Completing the slate were L. H. Bierly, Lafayette, and O. O. Pegg, Steubenville, who were selected for the first and second Vice-president posts respectively. Trustees chosen were L. E. Bushong, West Mansfield; Ira W. Barnes, Dayton; L. M. Kessler, Wellston, and C. E. Records and L. T. Hunziker of Columbus.

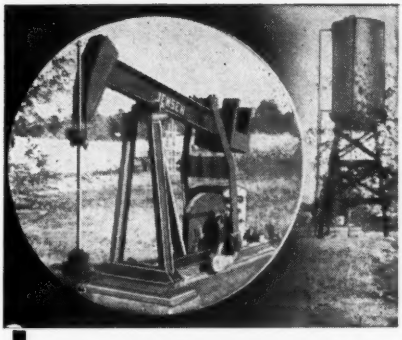
The morning session was addressed by G. W. White, state geologist, who talked on underground formations of the state and other subjects of interest to the drillers. The association also completed work on their well drillers contsruction code and copies of this will be available in ten days. Legislative and publicity committees were appointed in the afternoon.

Pumps Described In Bulletin

A NEW 20-page bulletin, "Peerless Vertical Close Coupled Turbine Pumps," has been issued by Peerless Pump Division, Food Machinery Corporation, 301 West Ave. 26, Los Angeles 31, Calif.

Devoted to describing and illustrating the specialized application of Peerless Turbine Pumps to industrial, municipal, engineering, and agricultural installations, the bulletin features cutaway views of the pump, schematic diagrams of suggested methods of various pump installations, and pictures of the pumps in numerous industrial applications. Details of pump engineering, construction, and operation are also described and illustrated.

Copies of this bulletin (B-159) may be obtained from the manufacturer.



Pump Handle Pete Says:

Cussin' Won't Help None

He shore wuz mad—this driller friend of mine. Seems he had drilled a good well but the customer hung some piece of junk on it and expected to get water. Course it wouldn't work — and the customer blamed the well.

You should of recommended a Jensen 'cause that well's mor'ne 100 ft. deep — says I.

Well sir, he shore kicked up the dust gettin' it fixed. Warn't no time 'tall till they wuz both happy.

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All advertising in this section is payable in advance. Enclose your check or money order with copy. Rate: 30c per line. Minimum charge $1.20. No discounts; no commissions. Count your own copy to avoid delay. The average line contains 28 characters (20 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number if blind advertisement is desired. Closing date—10th of preceding month. Example — January issue closes December 10th. Be sure to address separate inquiries to each advertiser by using the correct box numbers. Mail Box inquiries care of THE DRILLER, South Milwaukee, Wis.

DRILLS FOR SALE

500-ft. all steel spudder. 32-ft. tower, mounted on '34 Reo. 3½" tools, $1,000 cash. Ida Schmidler, 2201 Seward, Topeka, Kansas.

One Model 35 Armstrong all steel 500 ft. capacity machine, pneumatic rear tires, trailer hitch on front, rubber shock absorber, LeRoi gasoline engine. Price $1,000. Guy McElwee, Sidney, Illinois.

Model 35 Armstrong drill mounted on 1931 Model A Ford truck. Machine recently rebuilt and in excellent condition, ready for work. Offered with complete string of tools including 2 — 5" and 2 — 6" bits. 500' drilling line and 500' sand line. Blower mounted on machine. George R. Kriegel, Tigerton, Wisconsin

DRILLS FOR SALE

New 71 Speed Star for sale or trade for smaller machine. Preferably Bucyrus-Erie 21W O. F. Lippolt, R. F. D. No. 1, Danbury, Connecticut.

21-W Bucyrus-Erie drill mounted on Ford V-8 truck. Machine recently overhauled and in excellent condition. Offered less tools. Immediate delivery. Box 158

Bucyrus-Erie 33W drill mounted on 1937 Ford 1½-ton truck. LeRoi gasoline engine, derrick 33' with rubber shock absorber. Offered with or without tools. Excellent condition. Immediate delivery. Box 157

One No. 40 Sullivan rotary rig in A-1 condition. Rated 1200 feet, mounted on 3-ton white truck. With equip., fishing tools and bits. $5,000 to $7,000, according to equip. wanted. Carl Settle Drilling Co., Box 677, Wibaux, Mont.

Wood frame, 1500' Sparta cable drill in good condition. Rubber tires, new motor and cables. Lots of tools, 4 stems and drills 6 to 16". Price $1500. Levi Mackin, Loesch, Montana.

MISC. FOR SALE

20 tons brand new well driller accessory tools, 2x3—7 A.P.I. joints. Babcock sockets, fishing jars, 8 ft. stems, full circle and combination sockets, wire line cutters, 2 prong grabs with bailer latch, pulling rings, 50 ton jacks, underreamers, sand pumps, tool wrenches, etc. Send for list with prices. F. N. Hagmann, Jr., Vienna, Va.

MISC. FOR SALE

No. 14 rebuilt Armstrong mounted on hard rubber Duplex truck — exc. cond. 4-wheel drive.

500 ft. manila rope and 500' sand line cable almost new. One complete string of tools, 4½" x 24' stem and jars and 5" to 6" bits, chain tongs, button hooks, forge blower mounted, and misc. tools. Almost new V-8 power plant. Can be seen in operation. Cheap. H. J. Beede, Owatonna, Minn.

One combination jetting and cable drilling machine, all steel. Size 3' wide, 5' high, and 7' long. Price $1,325. One Dodge truck, 1937, ½-ton, price $700. Two Myers self-oiling bulldozers 4 x 5, price $250. One Goulds 3 x 5 pump, price $75. Drilling tools, price $751. Box 155

WANTED

One all steel truck-mounted well rig, with equipment. John Pikiell, Route 2, Bristol, Conn.

Bucyrus-Erie 21-W, with or without tools. With or without truck. Eastern section, cash price. Box 156

One 5" O.D. deep well pump, capacity 100 to 300 GPM, gasoline motor belt drive, TDH. 100 ft. minimum, new or used in good condition. Box 154

Will pay premium price for a 22 or 24 Bucyrus-Erie drilling rig. G. E. Foster, P. O. Box 14, Eldridge, Calif.

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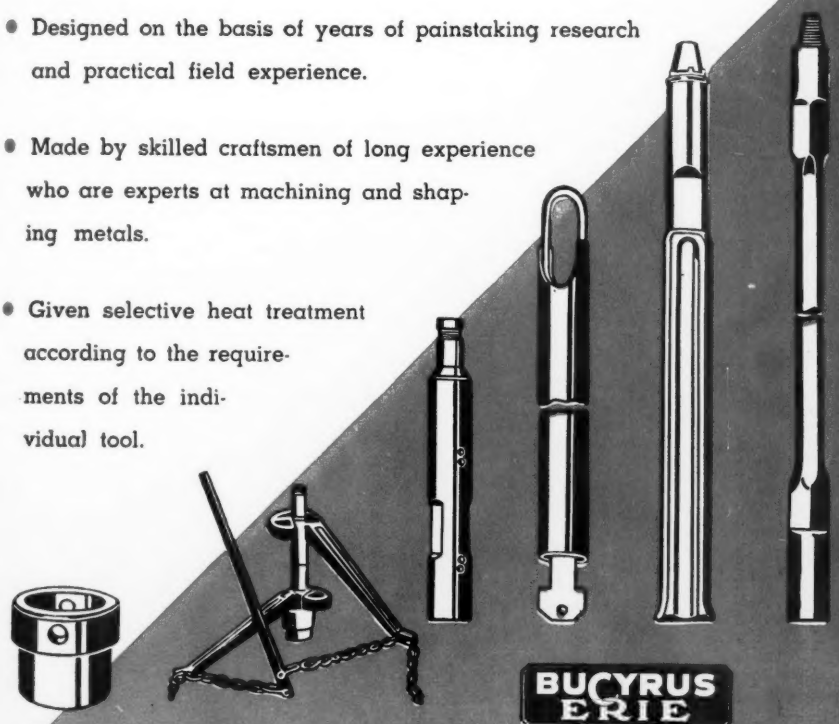

Send for tool catalog and price list and the next time you need drill bits, drilling and fishing jars, bailers, rope sockets, or other tools — try Bucyrus-Erie.

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FOR MONTH OF

January 1947

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This Gopher driller has plied his trade with an honest industriousness that has made the name of Nygard synonomous with water well drilling for miles around his northern Minnesota home.

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